

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.: MO-0125946

Owner: DM Farms/Arrowhead Farms Inc.
Address: P.O. Box 393, Nevada, MO 64772

Continuing Authority:
Address: Same as above

Facility Name: Murphy Farms, Bellamy Pyramid
Address: P.O. Box 393, Nevada, MO 64772

Legal Description: See Pages 2-3
Latitude/Longitude: +3741344/-09410084

Receiving Stream: Walnut Creek (C)
First Classified Stream and ID: Walnut Creek (C)(03634)
USGS Basin & Sub-watershed No.: (10290105-030002)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfalls #001 - #012 - Concentrated Animal Feeding Operation - SIC #0213

No Discharge of Process Waste. Class 1A.

One anaerobic lagoon/Two 2-stage lagoons/secondary containment structures/wastewater irrigation/storm water runoff/dead animal refrigeration units/domestic wastewater septic tanks to lagoons/ activated sludge wastewater treatment system with filtration and disinfection to provide an alternate source of water supply to the production buildings/nutrient reduction system.

Design population equivalent is 107,262.

Design flow is 137,586 gallons per day; 50,218,890 gallons per year. (.137mgd)

Design number of animals is 2,304 sows & litters; 14,553 gestation sows; 1,560 nursery pigs under 55 pounds; 4,628 finish hogs (8,697 animal units).

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

April 6, 2001 June 13, 2003
Effective Date Revised


Stephen M. Manford, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

April 5, 2006
Expiration Date
MO 780-0041 (10-93)

Jim Hull, Director of Staff, Clean Water Commission

FACILITY DESCRIPTION (continued)

Total Number of Acres Available for Land Application:

<u>Percent Slope</u>	<u>Land Owned by Permittee</u>	<u>Non-owned Land with Spreading Agreement Acres</u>	<u>Total</u>
0-10%	524.8	193.7	718.5
10-20%			
TOTAL	524.8	193.7	718.5

Outfall 001 - Site: Arrowhead Sow Farm

System Type: One 2-stage lagoon/secondary containment/storm water runoff/domestic wastewater septic tank to lagoon/land application/an activated sludge wastewater treatment system with filtration and disinfection to provide an alternate source of water supply to the production buildings.

Legal Description: NW ¼, SE ¼, Sec. 13, T34N, R30W, Vernon County

Design Number of Animals: 576 sows & litters; 3,798 gestation sows; 416 nursery pigs under 55 pounds; 1,200 finishing hogs.

Design Population Equivalent: 27,810. Animal Units: 2,257.

Design Liquid Volume (1 in 10 year): 34,805 gallons per day; 12,703,825 gallons/year.

Design Storage: 299 days. Storage volume: 1,420,212 cubic feet. 10,623,185 gallons.

Maximum Operating Level (Safety Volume Depth): 1 foot below overflow level.

Minimum Operating Level: 10.3 feet below overflow level.

Land Application: Rates are based on plant available nitrogen (PAN) approach.

Outfall #002 - Site: Wolfpack Sow Farm

System Type: One 2-stage lagoon/secondary containment/storm water runoff/domestic wastewater septic tank to lagoon/land application/nutrient reduction system.

Legal Description: SW ¼, SE ¼, Sec. 13, T34N, R30W, Vernon County

Design Number of Animals: 576 sows & litters; 3,798 gestation sows; 416 nursery pigs under 55 pounds; 1,200 finishing hogs.

Design Population Equivalent: 27,810. Animal Units: 2,257.

Design Liquid Volume (1 in 10 year): 35,789 gallons per day; 13,062,985 gallons/year.

Design Storage: 290 days. Storage volume: 1,420,298 cubic feet. 10,623,829 gallons.

Maximum Operating Level (Safety Volume Depth): 1 foot below overflow level.

Minimum Operating Level: 10.3 feet below overflow level.

Nutrient Reduction System: One artificially lined earthen basin 1,076,800 gallon capacity, one earthen basin 2,346,000 gallon capacity, one earthen basin 5,001,227 gallon capacity.

Land Application: Rates are based on plant available nitrogen (PAN) approach.

Outfall #003 - Site: Hawkeye Sow Farm

System Type: Anaerobic lagoon/secondary containment/stormwater runoff/domestic wastewater septic tank to lagoon/land application.

Legal Description: SW ¼, NW ¼, Sec. 19, T34N, R29W, Vernon County

Design Number of Animals: 1,152 sows & litters; 6,957 gestation sows; 728 nursery pigs under 55 pounds; 2,228 finishing hogs.

Design Population Equivalent: 51,642. Animal Units: 4,183.

Design Liquid Volume (1 in 10 year): 66,992 gallons per day; 24,452,080 gallons/year.

Design Storage: 365 days. Storage volume: 3,270,000 cubic feet. 24,459,600 gallons.

Maximum Operating Level (Safety Volume Depth): 1 foot below overflow level.

Minimum Operating Level: 8.1 feet below overflow level.

Land Application: Rates are based on plant available nitrogen (PAN) approach.

FACILITY DESCRIPTION (continued)

Outfall #004- Storm Water - Class U.

Legal Description: NE $\frac{1}{4}$, NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 13, T34N, R30W, Vernon County,
Unnamed Tributary to Walnut Creek at property line.

Outfall #005 - Storm Water - Class U.

Legal Description: SE $\frac{1}{4}$, NE $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 13, T34N, R30W, Vernon County,
Unnamed Tributary to Walnut Creek at property line.

Outfall #006 - Storm Water - Class U.

Legal Description: NE $\frac{1}{4}$, NE $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 13, T34N, R30W, Vernon County,
Unnamed Tributary to Walnut Creek at property line.

Outfall #007 - Stream Monitoring - Class C.

Legal Description: NE $\frac{1}{4}$, NE $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 19, T34N, R29W, Vernon County,
McCarty Creek at property line.

Outfall #008 - Stream Monitoring - Upstream - Class C.

Legal Description: SW $\frac{1}{4}$, SE $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 19, T34N, R29W, Vernon County,
McCarty Creek at property line.

Outfall #009 - Storm Water - Class U.

Legal Description: SE $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 24, T34N, R30W, Vernon County,
Unnamed Tributary to McCarty Creek at property line.

Outfall #010 - Storm Water - Upstream - Class U.

Legal Description: SW $\frac{1}{4}$, SE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 14, T34N, R30W, Vernon County,
Unnamed Tributary to Walnut Creek at property line.

Outfall #011 - Storm Water - Class U.

Legal Description: NE $\frac{1}{4}$, NE $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 14, T34N, R30W, Vernon County,
Unnamed Tributary to Walnut Creek at property line.

Outfall #012 - Dead Animal Transfer Station - SIC #4953

No Discharge refrigeration unit for temporary storage of dead animals until collection and transfer to off-site rendering or disposal facility. Any liquids draining from the holding areas will be pumped and hauled to a permitted treatment system and/or discharged into an animal waste lagoon.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS			PAGE NUMBER 4 of 23	
			PERMIT NUMBER MO-0125946	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:				
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS	MONITORING REQUIREMENTS	
		REQUIREMENTS	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfalls #001 - #003</u> - Emergency Discharge Monitoring				
Flow	MGD	No discharge of process waste except during emergency conditions.	once/day during discharge	24 hr. estimate
Biochemical Oxygen Demand ₅	mg/L	Comply with Water Quality Standards.	once/day during discharge	grab
Ammonia Nitrogen as N	mg/L	See Special Condition Numbers 1,2,3,9 & 10.	once/day during discharge	grab
<u>Outfalls #001 - #003</u> - Nutrient Monitoring For Land Application				
Total Kjeldahl Nitrogen as N	mg/L	See Special Conditions Numbers 4 & 10.	4/year	composite
Ammonia Nitrogen as N	mg/L	Sample liquids 4 times/year between March 1 and November 30 and 1/year for nitrate. Sample solids or sludges 1/month during land application periods.	4/year	composite
Total Phosphorus as P	mg/L		4/year	composite
Total Potassium as K	mg/L		4/year	composite
Nitrate/Nitrite as N	mg/L		1/year	composite
<u>Outfalls #001 - #003</u> - Land Application Operational Monitoring				
Lagoon or Storage Structure Freeboard	feet	See Special Condition Numbers 5,10, and 17 through 25.	once/month	measured
Land Application	hours		daily	total
Amount Land Applied	gallons or cu. feet		daily	total
Application Area	acres		daily	total
Application Rate	inches/acre		daily	total
Rainfall	inches		daily	total
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> THE FIRST REPORT IS DUE <u>October 28, 2003</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.				
B. STANDARD CONDITIONS				
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I</u> STANDARD CONDITIONS DATED <u>October 1, 1980</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.				

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS			PAGE NUMBER 5 of 23	
			PERMIT NUMBER MO-0125946	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:				
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS	MONITORING REQUIREMENTS	
		REQUIREMENTS	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfalls #004 - #011</u> - Storm Water Runoff Limits				
Flow	MGD	No discharge of process waste.	4/year	24 hr. estimate
pH - Units	SU	Water Quality Standards do not have to be exceeded to determine process waste being discharged.	4/year	grab
Ammonia Nitrogen as N	mg/L		4/year	grab
Nitrate/nitrite as N	mg/L		4/year	grab
Dissolved Phosphorus as P	mg/L	See Special Condition Numbers 1,2,6,8 and 10.	4/year	grab
Total Suspended Solids	mg/L	Sample 4 times per year at two or three month intervals between March 1 and November 30.	4/year	grab
Temperature	°C		4/year	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>October 28, 2003</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.				
B. STANDARD CONDITIONS				
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A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS										PAGE NUMBER 6 of 23				
										PERMIT NUMBER MO-0125946				
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:														
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)			UNITS	FINAL EFFLUENT LIMITATIONS					MONITORING REQUIREMENTS					
				DAILY MAXIMUM					MEASUREMENT FREQUENCY		SAMPLE TYPE			
Upstream Outfalls #008														
Downstream Outfalls #007														
Flow			MGD	No discharge of process waste.					1/month	24 hr. estimate				
pH - Units			SU	Comply with Water Quality Standards.					1/month	grab				
Ammonia Nitrogen as N			mg/L	Permittee shall not cause exceedance of stream limits.					1/month	grab				
Nitrate/Nitrite as N			mg/L						1/month	grab				
Dissolved Phosphorus as P			mg/L						1/month	grab				
Temperature			°C	See Special Condition Numbers 1,2,8 and 10.					1/month	grab				
Total Suspended Solids			mg/L	Sample on days other than when storm water runoff samples are collected.					1/month	grab				
The following are limits for ammonia as N in mg/L as daily maximum See Note 1														
Temp C		pH												
	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8	9.0	
4	3.9	3.9	3.9	3.9	3.9	3.9	3.4	2.4	1.5	1.0	0.6	0.4	0.3	
6	3.8	3.8	3.8	3.8	3.8	3.9	3.3	2.3	1.5	0.9	0.6	0.4	0.3	
8	3.8	3.8	3.8	3.8	3.8	3.8	3.2	2.3	1.5	0.9	0.6	0.4	0.3	
10	3.7	3.7	3.7	3.7	3.7	3.7	3.2	2.3	1.4	0.9	0.6	0.4	0.3	
12	3.6	3.6	3.6	3.6	3.6	3.6	3.1	2.2	1.4	0.9	0.6	0.4	0.3	
14	3.6	3.6	3.6	3.6	3.6	3.6	3.1	2.2	1.4	0.9	0.6	0.4	0.3	
16	3.5	3.5	3.5	3.5	3.5	3.6	3.0	2.2	1.4	0.9	0.6	0.4	0.3	
18	3.5	3.5	3.5	3.5	3.5	3.5	3.0	2.2	1.4	0.9	0.6	0.4	0.3	
20	3.4	3.4	3.5	3.5	3.5	3.5	3.0	2.1	1.4	0.9	0.6	0.4	0.3	
22	3.0	3.0	3.0	3.0	3.0	3.0	2.6	1.9	1.2	0.8	0.5	0.4	0.3	
24	2.6	2.6	2.6	2.6	2.6	2.6	2.3	1.6	1.1	0.7	0.5	0.3	0.2	
26	2.2	2.2	2.3	2.3	2.3	2.3	2.0	1.4	0.9	0.6	0.4	0.3	0.2	
28	2.0	2.0	2.0	2.0	2.0	2.0	1.7	1.3	0.8	0.5	0.4	0.2	0.2	
30	1.7	1.7	1.7	1.7	1.7	1.8	1.5	1.1	0.7	0.5	0.3	0.2	0.2	
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE October 28, 2003. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.														
B. STANDARD CONDITIONS														
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.														

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 7 of 23	
					PERMIT NUMBER MO-0125946	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM			MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfalls #007, 008</u>		Stream Limits (continued) (Note 1)				
Chloride	mg/L	230			1/year in May	grab
Fluoride	mg/L	4			1/year in May	grab
Dissolved oxygen (minimum)	mg/L	5			1/year in May	grab
Hardness (Total as CaCO3)	mg/L	*			1/year in May	grab
Total Suspended Solids	mg/L	*			1/year in May	grab
Chlorine (Total Residual)	µg/L	10			1/year in May	grab
Aluminum (Dissolved)	µg/L	750			1/year in May	grab
Arsenic (Dissolved)	µg/L	20			1/year in May	grab
Beryllium (Dissolved)	µg/L	5			1/year in May	grab
Boron (Total Recoverable)	µg/L	2000			1/year in May	grab
Chromium (Dissolved)	µg/L	100			1/year in May	grab
Cobalt (Total Recoverable)	µg/L	1000			1/year in May	grab
Iron (Dissolved)	µg/L	1000			1/year in May	grab
Selenium (Dissolved)	µg/L	5			1/year in May	grab
Mercury (Total Recoverable)	µg/L	0.5			1/year in May	grab
		HARDNESS			1/year in May	grab
		<125	125-200	>200		
		11.8	16.4	20		
		29	41	53		
		9	16	23		
		425	600	770		
		3.5	7	11		
Cadmium (Dissolved)	µg/L	1050	1483	1893	1/year in May	grab
Copper (Dissolved)	µg/L				1/year in May	grab
Lead (Dissolved)	µg/L				1/year in May	grab
Nickel (Dissolved)	µg/L				1/year in May	grab
Silver (Dissolved)	µg/L				1/year in May	grab
Zinc (Dissolved)	µg/L				1/year in May	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>January 28, 2004</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
B. STANDARD CONDITIONS						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I</u> STANDARD CONDITIONS DATED <u>October 1, 1980</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				PAGE NUMBER 8 of 23	
				PERMIT NUMBER MO-0125946	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:					
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	MONITORING REQUIREMENTS			
		Screening Number		MEASUREMENT FREQUENCY	SAMPLE TYPE
Storm Water Monitoring within 24 hours after land application					
Drainage Area		Upgradient Outfalls		Downgradient Outfalls	
A.		None		004	
B.		None		005	
C.		None		006	
D.		010		011	
Flow	MGD	See requirements below.		4/year	24 hr. estimate
Ammonia Nitrogen as N	mg/L	See Special Condition Numbers 1,2,8 and 10.		4/year	grab
<p>a. This monitoring procedure will be used as a screening method to evaluate whether there was a discharge of process wastewater during land application. Storm water runoff samples will be collected from the upgradient and downgradient outfalls for each specified drainage area when there has been land application in the respective drainage area within 24 hours prior to the start of precipitation. Screening numbers are as follows: if the difference between the upgradient and downgradient outfalls for ammonia-N is greater than 6 mg/L; or at locations where there is no upgradient outfall, if the ammonia-N is greater than 6 mg/L. If the screening numbers are exceeded the permittee shall submit a written report within five working days after receipt of testing results to provide justification for the exceedance and provide a plan for preventing future exceedances to the extent practical. Based on evaluation of the results, the department will determine if a discharge of process wastewater has occurred.</p> <p>b. Monitoring for ammonia-N shall be conducted for at least four (4) storm water runoff events per year for each of the listed drainage areas provided there are specific rainfall runoff events to meet the criteria specified herein. This monitoring is in addition to other storm water monitoring listed in this permit.</p> <p>c. Monitoring will occur as soon as practicable after the start of storm water runoff. Samples will be collected within the first sixty (60) minutes after the start of the runoff, or as soon as practicable. Monitoring is only required to be conducted during daylight hours. Permittee will address specific sampling procedures in Operations and Maintenance Manual.</p> <p>d. Such monitoring is not required for fields where animal waste is land applied by subsurface injection equipment or where surface applied wastes have been incorporated into the soil prior to the start of precipitation.</p> <p>e. If only one storm water runoff event occurs during a monitoring period, separate samples shall be collected and tested to fulfill both the monitoring requirements within 24 hours after land application and the additional monitoring required under section A and Special Condition #6 of this permit.</p>					
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>October 28, 2003</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.					
B. STANDARD CONDITIONS					
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I</u> STANDARD CONDITIONS DATED <u>October 1, 1980</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.					

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				PAGE NUMBER 9 of 23	
				PERMIT NUMBER MO-0125946	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:					
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	PARAMETERS		MONITORING REQUIREMENTS	
		REQUIREMENTS		MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfalls #001 - #003- Other Lagoon Monitoring</u>					
Total Arsenic	mg/L	*	See Special Condition Numbers 1,2 and 10	2/year in May & Oct	grab
Total Copper	mg/L	*		2/year in May & Oct	grab
Total Molybdenum	mg/L	*		2/year in May & Oct	grab
Total Nickel	mg/L	*		2/year in May & Oct	grab
Total Selenium	mg/L	*		2/year in May & Oct	grab
Total Zinc	mg/L	*		2/year in May & Oct	grab
Total Suspended Solids	mg/L	*		2/year in May & Oct	grab
Other Chemicals Used at the Facility (Note 2)	mg/L	*		2/year in May & Oct	grab
<u>All Outfalls - Monitoring of Unauthorized Discharges</u>					
Flow	MGD	No discharge of process waste.		once/day during discharge	24 hr. estimate
Biochemical Oxygen Demand ₅	mg/L	Water Quality Standards do not have to be exceeded to determine process waste being discharged. An unauthorized discharge is a permit violation in itself.		once/day during discharge	grab
Ammonia Nitrogen as N	mg/L			once/day during discharge	grab
pH - Units	SU			once/day during discharge	grab
Temperature	°C			once/day during discharge	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>October 28, 2003</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.					
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IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I</u> STANDARD CONDITIONS DATED <u>October 1, 1980</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.					

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				PAGE NUMBER 10 of 23	
				PERMIT NUMBER MO-0125946	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:					
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		DAILY MAXIMUM		MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfalls #001 - #003</u> - Secondary Containment Monitoring					
Flow	MGD	*	See Requirements below.	each release	24 hr. estimate
Ammonia Nitrogen as N	mg/L	2.5	See Special Condition Numbers 1,2,10 and 26.	each release	grab
<p>a. There shall be no discharge of process wastewater from secondary containment structures. The procedure listed below shall be used to determine when there is no process wastewater in the containment structure and the containment water may be released. All flows into and flows removed from secondary containment structures and testing of the water shall be recorded and reported to the department. Any releases from secondary containment shall not cause a violation of the water quality standards.</p> <p>b. Containment structures below confinement buildings and lagoons.</p> <p>1. Any wastewater spills or leaks collected in the containment structures shall be pumped into the lagoon or directly land applied so that there is no discharge. Once the containment structure has been emptied, it shall be rinsed with fresh water until the ammonia nitrogen content of water remaining in the basin is less than 2.5 mg/L. Rinse water that exceeds these limits shall be pumped from the containment structure into the lagoon or land applied so that there is no discharge.</p> <p>2. Before release of any potentially uncontaminated storm water runoff from the containment structures the water shall be tested for ammonia. Storm water may be released from the containment structure when the ammonia-N content is less than 2.5 mg/L. Storm water that exceeds these limits shall be pumped into the lagoon or land applied so that there is no discharge.</p> <p>c. In field testing for ammonia, nitrogen using colorimetric testing or other approved testing methods may be used for sampling of containment structures.</p> <p>d. As-built drawings or diagrams; information on volume, dimensions, piping and valves; and location maps for all existing containment structures shall be submitted to the department within 60 days after permit issuance.</p> <p>e. The Operation and Maintenance Manual shall contain specific operating requirements for the secondary containment structures.</p> <p>f. Testing results on water released from the containment structures shall be submitted Quarterly beginning on the quarterly reporting date listed under Section A of the permit.</p> <p>g. Storm water runoff that does not come in contact with wastewater leaks, spills or over application of land applied wastes is not considered process wastewater under 10 CSR 0-6.300.</p>					
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>October 28, 2003</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.					
B. STANDARD CONDITIONS					
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I</u> STANDARD CONDITIONS DATED <u>October 1, 1980</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.					

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS			PAGE NUMBER 11 of 23	
			PERMIT NUMBER MO-0125946	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:				
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	PARAMETERS	MONITORING REQUIREMENTS	
		REQUIREMENTS	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>All Land Application Fields - Soil Monitoring</u>				
Nitrate/Nitrogen as N	mg/kg	See Special Condition Numbers 7,10 and 22.	2/year in April/Oct	Composite
Soil pH	Std Unit		1/3 Years	Composite
Percent Organic Matter	%		1/3 Years	Composite
Cation Exchange Capacity	Std Unit		1/3 Years	Composite
Exchangeable Sodium Percentage	%		1/3 Years	Composite
Available Phosphorus as P (Bray P-1 test method)	mg/kg		1/3 Years	Composite
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>January 28, 2003</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.				
B. STANDARD CONDITIONS				
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I</u> STANDARD CONDITIONS DATED <u>October 1, 1980</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.				

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only (see Special Conditions).

Note 1 - Effluent limits do not apply to outfalls designated as upstream. Results of upstream outfalls will be used in conjunction with results of downstream outfalls to determine if a violation has occurred. If results at the upstream outfalls are greater than the effluent limit for downstream outfalls, permittee shall not cause an increase above the upstream results. A Quality Assurance Project Plan (QAPP) shall be developed following guidance in USEPA publication EPA/600/R-98/018. Permittee shall submit the QAPP to the department for approval within six (6) months of permit issuance. The department will review the QAPP and request any necessary changes within eight (8) months of permit issuance. The QAPP must be finalized by permittee and approved by DNR within one year of permit issuance.

Note 2 - Monitor for any additional chemicals used or added at the facility including feed ingredients, medicinals, cleaners, disinfectants and other pollutants.

C. SPECIAL CONDITIONS

1. Water Quality Standards

- a. Operation of this facility shall not cause a violation of water quality standards rule under 10 CSR 20-7.031.
- b. General Criteria. The following water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
 - (a) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
 - (b) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
 - (c) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
 - (d) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
 - (e) There shall be no significant human health hazard from incidental contact with the water;
 - (f) There shall be no acute toxicity to livestock or wildlife watering;
 - (g) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
 - (h) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

2. No-Discharge Requirement: No Discharge except during emergency conditions

- a. The permittee shall land apply wastewater on suitable days as needed to keep the storage structure within design operating levels. The storage shall be maintained as near to the minimum operating level (maximum storage capacity) as practicable so as to provide capacity for process wastewater flows plus the 1-in-10-year chronic rainfall and the 25-year, 24-hour rainfall based on the design storage period listed in the facility description. There shall be no-discharge of process waste during dry weather conditions when soils are suitable for irrigation. If wastewater has been properly land applied on all suitable days during the last 12 months, emergency discharge is allowed by overflow through the emergency spillway of the storage structure due to storm events exceeding the chronic or catastrophic storm events for the design storage period, but discharge shall cease as soon as land application is feasible. Process waste discharge is not allowed by pumping, siphoning, cutting of berms, irrigation runoff, or any other method, except as authorized herein. Permittee shall make every reasonable effort to cease discharge as soon as soil conditions are suitable for irrigation.

b. Definition: Process Waste

Process waste as defined in 10 CSR 20-6.300 includes manure, wastewater and any precipitation which comes into contact with any manure, litter or bedding or any other raw material or intermediate or final material or product used in the production of animals or direct products. It includes spillage or overflow from animal watering systems; washing, cleaning or flushing of pens, barns, manure pits or other associated animal operations; washing or spray cooling of animals; dust control; storm water runoff from animal confinement areas and loading and unloading areas; storm water runoff from deposits of airborne dust from building ventilation systems or spillage of feed or manure; discharges from land application fields that occur during land application; and storm water runoff from land application fields if wastes are applied during frozen, snow covered or saturated soil conditions or if application rates exceed the maximum nitrogen utilization of the vegetation grown.

C. SPECIAL CONDITIONS (continued)

3. Monitoring of Wastewater Discharge (All Outfalls - See Section A)
 - a. Any emergency wastewater discharge or unauthorized discharge of process wastewater that occurs due to lagoon or storage structure overflow, wastewater bypassing, manure stockpiles, land application or other sources shall be monitored once/day for ammonia nitrogen as N and biochemical oxygen demand (BOD₅).
 - b. Samples shall be collected of the discharge at the downgradient property boundary. Samples shall also be collected from any defined drainage that is above and below the receiving waters at the downgradient property boundary. If the receiving drainage is dry above the discharge point, report as no stream flow above the discharge point.
 - c. Records shall be maintained for time, date, location, and duration of the discharge and an estimate of the discharge volume.
 - d. Notify the department as soon as possible and no later than within 24 hours of any discharge that occurs and submit monitoring results within 30 days.
4. Nutrient Monitoring for Land Application (See Section A)
 - a. Wastewater from each lagoon cell shall be sampled and tested at least 4 times/year at regular intervals between March 1 and November 30. Samples shall be tested for Total Kjeldahl Nitrogen (TKN) as N, ammonia nitrogen as N, total phosphorus as P, and total potassium as K. Samples shall also be tested at least once/year for nitrate/nitrite nitrogen from each lagoon. Each sample shall be a composite sample consisting of at least seven (7) grab samples. Samples should be collected from the lagoon, irrigation pump or wet well, irrigation equipment, recycle pump, or flush tank. The samples shall be taken so as to represent variations in wastewater concentrations within the lagoon minimum and maximum pump down levels. Samples collected directly from the lagoon shall be taken from two to five feet below the lagoon water surface, at least fifteen feet from the waters edge and at least seven different locations spaced about equally around the perimeter of the lagoon. If the lagoon will be agitated before pumping, the samples must be taken during agitation. When sampling at the recycle pump, the seven grab samples shall be taken at two - three minute intervals or longer. For sampling flush tanks, one or more grab samples shall be taken from each tank.
 - b. Solids or sludges shall be sampled and tested separately. At least one composite sample shall be collected for each month when land application occurs. Each composite sample shall consist of at least 20 grab samples. Solids and sludges shall be tested for total Kjeldahl nitrogen as N, ammonia nitrogen as N, total phosphorus as P, and total suspended solids.
5. Land Application Operational Monitoring (See Section A)
 - a. The inches of precipitation received at the production site shall be recorded daily and shall be reported quarterly for daily amounts, monthly totals, and cumulative total.
 - b. Daily records shall be kept on file by each field for land application locations, volumes, acres, inches/hour, inches/acre, time of applications, and which lagoon was being pumped. These shall be summarized in the quarterly and annual reports. Daily totals shall be kept on file by permittee and cumulative amounts submitted quarterly and in the annual report.
 - c. Monthly measurements shall be made of the water level in each lagoon and shall be recorded as feet below the emergency overflow elevation. Report quarterly.
 - d. Nitrogen application rates, crop yields, crop nitrogen requirements, and other operational monitoring shall be recorded for each field and reported in the annual report.

C. SPECIAL CONDITIONS (continued)

6. Storm Water Runoff Monitoring

- a. Samples required in this paragraph shall be collected at the storm water monitoring locations listed in Section A of this permit.
- b. Storm water runoff shall be monitored 4 times/year for ammonia nitrogen as N, nitrate/nitrite nitrogen as N, dissolved phosphorus as P, total suspended solids, pH, and temperature.
- c. Samples shall be collected during storm water runoff events that occur after rainfalls of at least 0.5 inch within a 24-hour period. Collect the sample within sixty minutes after the beginning of storm water runoff.
- d. If there are no runoff events during a monitoring period, report as no discharge of storm water.
- e. A storm water runoff event is defined as a 24-hour period after the start of runoff. Runoff occurring after that will be considered as a separate runoff event.
- f. Monitoring is required for watersheds where process waste has been land applied within the last 12 months. If there has been no land application within a watershed for the previous 12 months, the Monitoring report shall specify **"Monitoring not required due to no land application within the last 12 months"**.

7. Soil Monitoring

- a. Composite soil samples shall be collected for all sites where land application has occurred within the last 12 months or where land application will occur within the next 12 months.
 - (1) Nitrate nitrogen as N shall be tested twice per year in spring and fall. Soil samples may be collected for the top 0-12 or 0-24 inches or more.
 - (2) Soil pH, percent organic matter, cation exchange capacity, exchangeable sodium percentage and available phosphorus as P (Bray P-1 test method) shall be sampled prior to land application and once every three (3) years thereafter, unless no additional land application has occurred at the site. Samples shall be collected for the surface 0-6 inches.
- b. Soil sampling shall be in accordance with University of Missouri (MU) publication G9110, "Sampling Your Soil For Testing" or other methods approved by the department.
- c. Soil testing methods shall be in accordance with North Dakota Agricultural Experiment Bulletin 499-Revised, "Recommended Chemical Soil Test Procedures for the North Central Region" or other test methods approved by the department. Soil textural classes shall be based on USDA Soil Taxonomy.
- d. The annual report shall include a summary of the soil test results for each field.

8. Sample Collection, Preservation and Testing Methods

In field testing methods or other approved methods may be used for storm water and in-stream monitoring under this permit. Other testing shall be sent to a qualified independent testing laboratory that participates in the "Laboratory Quality Assurance Program" approved by the U.S. Environmental Protection Agency (EPA). All samples that are not tested in field, shall be immediately packed in ice or refrigerated and delivered to the laboratory in ice packed containers. Preservation and analytical procedures shall be in accordance with the most current version of Standard Methods for the Examination of Waters and Wastewaters or other approved methods listed in 10 CSR 20-7.015(9)(A).

9. Required Notification of Releases

- a. Any wastewater discharge into waters of the state shall be reported to the Department as soon as possible and no later than 24 hours after the start of the discharge.
- b. Spills or leaks that are contained on the property shall also be reported to the Department within 24 hours, if the flow exceeds 1,000 gallons per day. This includes leaks from sewer lines, recycle lines, flushing systems, lagoons or irrigation systems.

C. SPECIAL CONDITIONS (continued)

10. Annual Report

An annual report is required in addition to the quarterly reporting under Section A of this permit. The annual report shall be submitted by January 28 of each year for the previous growing season from October 1 through September 30 or an alternate 12 month period approved by the Department and listed in the Operation and Maintenance Manual. This report shall be submitted using report forms approved by the Department and shall include a summary of the monitoring and record keeping required by the Special Conditions and Standard Conditions of this permit.

11. Operation Description

- a. This permit authorizes operation of the system as indicated in the Facility Description of this permit.
- b. The system listed in the facility description of this permit shall not be placed into operation until submittal of the engineering certification of completed construction and approval by the department. Barrel tests to determine lagoon leakage rates shall be conducted on all newly constructed lagoons in accordance with 10 CSR 20-8.020 (16) (B) and shall be submitted with the engineering certification of completed construction. The department shall be notified at least seven (7) days prior to the barrel testing dates to allow observation of the tests.

12. Design Capacity

Permittee shall not exceed the design capacity information listed in the Facility Description Section of this permit. Any proposed increases must be reported in accordance with Standard Conditions Part I, Section B, Paragraph 1., and may require a permit modification prior to the proposed change.

- a. Design Population Equivalent: The Design Population Equivalent is the human equivalent based on the annual average daily pounds of animals at the design capacity listed in the permit application. The average daily pounds of animals multiplied by a standard conversion factor equals the Design (human) Population Equivalent. The conversion factors are: 0.015 swine, 0.014 beef; 0.020 dairy; 0.030 laying hen; 0.040 turkey; and 0.05 poultry broiler.
- b. Design Flow: The design flow in gallons per day is based on the maximum annual flows including storm water flows during the one-in-ten year return frequency for annual or 365 day rainfall minus evaporation. The design flow is based on the time period when the flows are generated at the production site and not when flows are land applied. Any excess flow may be stored and carried over into the following year for land application, as necessary. Permittee may exceed the design flow when precipitation in any 365 day period exceeds the one-in-ten year annual precipitation amount.
- c. Animal Units: Animal Units are based on the maximum number and weight of animals at design capacity of the animal confinement buildings and lot areas.
- d. Reporting Requirements: The actual operation numbers compared to the permitted design capacity shall be summarized in the annual report.

13. Construction Permits

All wastewater systems shall be constructed in accordance with a construction permit except where exempted by state regulations under 10 CSR 20-6.300.

14. Emergency Spillways

All lagoons shall have emergency spillways maintained as shown on the approved construction plans or approved as-built specifications.

15. HB1207

Permittee shall maintain compliance with all applicable provisions of state law under 640.725 to 640.735 RSMo, Supp.1996 (HB1207).

C. SPECIAL CONDITIONS (continued)

16. Reopener Clause

- a. This permit may be reopened and modified or alternatively revoked and reissued, to incorporate new or modified limitations or other conditions pertaining to phosphorus application rates to soils, the adequacy of wastewater lagoon liners, or other special conditions as may be necessary to protect waters of the state.
- b. Comprehensive Nutrient Management Plan.
The permit may be modified or reopened to require submittal of a Comprehensive Nutrient Management Plan (CNMP) in accordance with USEPA and USDA guidelines and regulations or where determined appropriate by the department to meet water quality standards for nutrients. This determination may be based upon ambient water quality monitoring, Section A monitoring requirements and other applicable information.
- c. This permit may be reopened and modified or alternatively revoked and reissued to incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analyses, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the states water quality standards.

17. Land Application Site Locations

The permittee shall land apply wastewater only to suitable sites located within the overall property boundaries and descriptions listed in the permit application and associated operation plans. Permittee requests for additional sites including non-owned property must follow permit modification procedures prior to land application.

18. Separation Distances for Land Application Sites

Separation distances (buffer zones) shall be maintained between the land application site and other features as follows:

- a. Surface Application.
 1. 300 feet from any losing stream, open sinkholes, water supply wells, or water supply reservoirs;
 2. 100 feet from classified gaining streams for Class P and Class C streams listed in 10 CSR 20-7.031); and
 3. 50 feet from unclassified gaining streams, public roads, or property boundaries.
- b. Subsurface Injection.
 1. 300 feet from any losing stream, open sinkholes, water supply wells, or water supply reservoirs;
 2. 50 feet from classified gaining streams (Class P and C streams listed in 10 CSR 20-7.031); and
 3. 25 feet from unclassified gaining streams, public roads, or property boundaries
- c. Implementation procedures for these limitations shall be detailed in the Operation and Maintenance Manual.

19. Land Application Limitations

- a. Process wastes should be land applied as close as practicable to when plants will utilize nutrients. Fall application for the spring crop season may be used where appropriate, but should not be the primary application period. Process wastes should be utilized as a nutrient resource.
- b. Process wastes shall not be land applied during frozen, snow covered or saturated soil conditions.
- c. Avoid application or reduce application rates and modify application practices when there is a local, applicable weather forecast or observation by permittee of an imminent or impending storm event. Land application shall cease as soon as practicable upon occurrence of any precipitation.

C. SPECIAL CONDITIONS (continued)

19. Land Application Limitations (continued)

- d. Land application equipment shall be operated in such a manner that wastes do not reach an adjoining property line. Rigorous inspection procedures shall be implemented for insuring that no visual spray drifts across public roads, property boundaries, or surface water sources. If the employee detects wind blown mist within 50 feet of an adjoining property line, public roadway, or surface water source, the application equipment shall be either moved farther away or shut down.
- e. All application sites shall use soil conservation practices that meet Soil Conservation Standards of the USDA, Natural Resources Conservation Service (NRCS).
- f. Spray irrigation systems (travelling guns, center pivot, fixed spray nozzles, etc) shall have automatic shut-off devices in the case of pressure loss.
- g. Operators shall check irrigation pipelines, equipment and the perimeter of application fields at least once per hour during land application to insure that applied wastewater does not run off the fields where applied and does not enter waters of the state.
- h. Land application rate shall be measured during start up of spray irrigation equipment each day of operation. Calibration of traveling gun irrigation systems shall be verified at least once/month using rain gauges or collection pans within the spray pattern of the equipment to determine application rates in inch per application pass and inch per hour.
- i. Permittee shall maintain a daily record of days that are suitable for land application based on soil moisture records, checkbook methods or other methods approved by the department. Suitable days will include soil moisture capacity of less than 75% field (saturation) capacity or other days when application can be performed without creating puddles of wastewater on the soil surface or runoff of applied wastewater. Suitable days by the checkbook method shall include any series of four days or more when there is no significant rainfall, and net evapotranspiration above rainfall exceeds 1.0 inch. When average daily temperatures are above 45 degrees, the typical evapotranspiration rate is 0.2 - 0.5 inch per day.
- j. Implementation procedures for these limitations shall be detailed in the Operation and Maintenance Manual.

20. Hydraulic Application Rates and Field Slopes

- a. Hydraulic application rates in inches/hour and inches/day shall not exceed the soil infiltration capacity and soil moisture holding capacity (saturation capacity) of the soil. In no case shall the application result in the runoff of applied waste during or immediately following application.
- b. Slopes exceeding 20 per cent (20%) shall not be used for land application.
- c. For field slopes less than ten percent (0-10%), surface application rates shall not exceed 0.2 to 0.5 inch/hour and 1.0 inch/day depending on soil type except for short periods when initial soil moisture is significantly below field capacity in accordance with 10 CSR 20-8.020(15)(F)6.
- d. For field slopes between ten and 20 percent (10-20%), surface application rates shall be reduced to ½ the rate for slopes less than 10%. For soil permeability of less than two-tenths inch (0.2") per hour, the designed maximum application rate should be as low as practicable and shall not exceed two-tenths inch (0.2") per hour. Permittee may land apply wastewater on these field slopes only after submitting a revised O&M Manual for achieving the above application rates and receiving prior approval from the department. The O&M plan shall include a topographic map showing slopes, drainage patterns and soils information. The number of acres approved for various slope conditions are listed in the facility/operation description section of this permit.

C. SPECIAL CONDITIONS (continued)

20. Hydraulic Application Rates and Field Slopes (continued)

- e. For subsurface injection, application rates shall be based on soil absorption capacity during land application so that there are no puddles of wastewater on the soil surface. For application rates exceeding 0.5 inch/day (13,577 gallons/acre), the permittee must submit a revised O&M Manual and receive prior approval from the department. In no case shall the application rate exceed 0.75 inch/day (20,365 gallons/acre). The subsurface application rate and procedures for adjusting the rate to match soil moisture and field slope conditions shall be listed in the approved Operation and Maintenance Manual.

21. Land Application Equipment

- a. Subsurface Injection should be considered where feasible and practicable to reduce exposure to wash off by storm water runoff and to retain nutrients in the soil for crop requirements. Surface application may be used when practical. The ratio of surface and subsurface application shall be outlined in the Operation and Maintenance Manual.
- b. Permittee shall own or have signed contracts with a commercial applicator to have adequate land application equipment readily available with capacity to apply 120% of the annual process wastewater flows (liquids, sludges and solids) within 85 ten-hour days over the number of acres required for nutrient utilization.
- c. Implementation procedures for these limitations shall be detailed in the Operation and Maintenance Manual.

22. Nutrient Management

- a. Nitrogen. The permittee shall not exceed the plant available nitrogen management approach as listed in this permit.
- b. Phosphorus. Application rates shall not increase soil P levels above 120 pounds per acre soil test P using Bray P-1 test method. When soil test P is at or above 120 pounds per acre, the nutrient application rates shall not exceed the annual crop uptake levels for phosphorus. When state NRCS standards and guidelines become available, the permit will be revised to include the Phosphorus Threshold and Phosphorus Index methods to be developed under the USDA, NRCS National Policy, General Manual, Part 402.06.
- c. The actual application rates for a given year or growing season must be adjusted based on the approved management approach and the actual wastewater and soil testing results and crop requirement. If crop yields are significantly less than that predicted in the nutrient management plan for reasons other than climatic factors, the application rates must be adjusted or the yields increased through appropriate changes in management practice.
- d. This permit will be modified to require a Comprehensive Nutrient Management Plan(CNMP) after promulgation of applicable EPA rules and guidelines. The CNMP will replace the current PAN and phosphorus methods.

C. SPECIAL CONDITIONS (continued)

23. Plant Available Nitrogen Procedure

- a. The Plant Available Nitrogen (PAN) method predicts the typical amount of nitrogen that is expected to be available to plants based on the median or average values from the reference publications listed herein. Actual nitrogen available to plants during a growing season may be more or less than the predicted values due to climatic variations. Supplemental nitrogen applications during the growing season may be added to correct plant deficiencies. Wastewater, sludge and fertilizer nitrogen applications shall be based upon crop nitrogen requirements based on realistic crop yield goals. The wastewater application rate shall be calculated as follows:

$$\text{PAN} = \text{CNR} - \text{SRN} - \text{CFN}$$

WHERE: **CFN** = Commercial Fertilizer Nitrogen applied in pounds N/acre.
CNR = Crop Nitrogen Requirement in pounds N/acre
PAN = Plant Available Nitrogen in wastewater and sludges
expressed as annual pounds N/acre.
SRN = Soil Residual Nitrogen in pounds N/acre.

- b. Plant Available Nitrogen(PAN) is calculated as follows:

$$\begin{aligned} \text{PAN} = & [\text{Ammonia Nitrogen}] \times [\text{Availability Factor}] \\ & + [\text{Organic Nitrogen}] \times [\text{Availability Factor}] \\ & + [\text{Nitrate Nitrogen}] \times [\text{Availability Factor}] \end{aligned}$$

Note: For anaerobic treated wastewater and sludges, the nitrate nitrogen amounts will be negligible and can be ignored.

- c. Plant Available Nitrogen (PAN) Availability factors for wastewater and sludges are as follows:

1. Average availability factors for all fields:

<u>Type of Nitrogen</u>	<u>Surface Application</u>	<u>Immediate Incorporation or Subsurface Injection</u>
Organic	0.25 - 0.75*	0.25 - 0.75*
Ammonia	0.6**	0.9**
Nitrate	0.9**	0.9**

* Organic Nitrogen = [Total Kjeldahl Nitrogen as N] - [Ammonia as N].

Availability Factors based on time after application and waste type are:

Type of Manure by Animal Type and Waste Storage Method	Availability Factor by Time Period			
	Year 1	Year 2	Year 3	Cumulative Year 3+
	1	2	3	Year 3+
Anaerobic Lagoons (all animals/poultry)	0.35	0.18	0.09	0.62
Liquid storage basins (except poultry)	0.35	0.18	0.09	0.62
Poultry - storage basins and dry litter	0.60	0.10	0.05	0.75
Manure solids - beef, dairy, swine				
without bedding	0.35	0.18	0.09	0.62
with bedding	0.25	0.13	0.07	0.45

NOTES: Year 1 is the current year of manure application; year 2 is the previous year of manure application; and year 3 is manure application two years ago. Nitrogen availability for years 1, 2 and 3 must be added when manure is applied in consecutive years. The cumulative factor is used when manure is applied at about the same rate for 3 consecutive years or longer.

** Inorganic nitrogen availability (nitrate + ammonia) based on the typical soil and climate conditions when considering additions due to precipitation, dry deposition, and foliar absorption versus losses due to volatilization and denitrification (10% denitrification loss is included). The permittee may choose to use this average value for

all fields or may adjust the N availability based on site specific soil conditions using the tables below **under paragraph 23.c.2.**

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D. SPECIAL CONDITIONS (continued)

23. Plant Available Nitrogen Procedure (continued)

2. Field Specific Availability Factors for Inorganic Nitrogen.

For ammonia and nitrate nitrogen factors, the permittee may choose to use the average value for all fields under paragraph C.1. above, or may use the alternate factor on a field specific basis using the tables below. The approved factors for each field will be included in the O&M Manual.

Table A. Alternate Field Specific Availability Factor for Surface Application					
Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat Poorly drained	Poorly drained
% of inorganic N (manure., precipitation) available					
< 2	71	66	62	56	45
2-5	66	60	56	49	30
> 5	63	56	49	38	19
Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook(AWMFH),April 1992, Tables 11-6 and 11-8.					

Table B. Alternate Field Specific Availability Factor for Sub-Surface Injection or Immediate Incorporation.					
Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat Poorly drained	Poorly drained
% of inorganic N (manure., precipitation) available					
< 2	89	84	78	70	57
2-5	84	76	70	62	38
> 5	80	70	62	48	24
Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook(AWMFH),April 1992, Tables 11-6 and 11-8.					

d. Soil Residual Nitrogen (SRN).

- For Annual Crops, the nitrogen availability from soil organic matter must be included based on soil CEC and crop season as follows:

$$\text{SRN in pound N/acre*} = [\text{percent organic mater}] \times \text{Soil Availability Factor}$$

Soil Availability Factor by Soil CEC Ranges and Organic Matter				
Growing Season	Organic Matter	CEC < 10	CEC 10-18	CEC >18
Summer	1%	40*	20	10
Winter	1%	20*	10	5

***Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pounds nitrogen for summer and 30 pounds for winter.

- For Perennial Crops the SRN is considered zero(0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.

C. SPECIAL CONDITIONS (continued)

23. Plant Available Nitrogen Procedure (continued)

e. Conversion Factors for laboratory testing results:

[mg/L or mg/kg or ppm] x [conversion factor] = [pounds per Unit Volume]

<u>Unit Volume</u>	<u>Conversion Factors</u>
lbs/acre inch	0.226
lbs/1,000 gallons	0.0083
lbs/100 cubic feet	0.0062
lbs/ton (wet wt)	0.002

- f. Crop nitrogen requirements shall be based on University of Missouri publication, Soil Test Interpretations and Recommendations Handbook, as revised or one of the other reference publications listed in this permit. Alternate reference publications may be used only upon prior approval by the department and shall be listed in the approved Operation and Maintenance Manual.
- g. If a crop is not harvested, the PAN rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.
- h. PAN calculations for land used for grazing cattle shall include both manure additions by cattle and crop nitrogen consumed by the cattle based on actual cow days per acre/year. This permit does not authorize grazing of cattle where prohibited by state statute under Chapter 350 RSMo.
- i. PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.
- j. Alternate nitrogen availability factors may be considered based upon site-specific conditions for each field and submittal of scientific justification. Alternate factors will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- k. Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- l. Primary reference publications used herein are:
1. Livestock Waste Facilities Handbook, Midwest Plan Service, MWPS-18, April 1993.
 2. National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
 3. Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc., 1991.
 4. Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December, 1992.
 5. Plant Available Nitrogen Procedure, Missouri Department of Natural Resources, Water Pollution Control Program, April, 1998.

C. SPECIAL CONDITIONS (continued)

24. Operation and Maintenance Manual

- The permittee shall develop, maintain and implement an Operation and Maintenance(O&M)Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to the departments Water Pollution Control Program and Regional Office for review and approval. The O&M Manual shall include, but is not limited to, the following:
- a. Detailed topographic maps of the property showing all land application fields including the identification numbers for each field. The maps shall also indicate separation distances from streams, ponds, wells, and property lines and shall indicate areas of 0-10% slope, 10-20% slope, and over 20% slope. Indicate areas that are not suitable for land application. The maps shall also include the location of all buildings, pump stations, lagoons, containment structures, irrigation pipelines, irrigation riser connections, underground terrace outlets, composting areas, dead animal storage or disposal areas, domestic wastewater treatment systems and other waste handling units.
 - b. Start up procedures, field supervision during operation, and shutdown procedures of irrigation equipment.
 - c. Procedures for providing the separation distances required by this permit and as specified in 10 CSR 20-8.020 (15) (B).
 - d. Sample collection, preservation, and testing procedures.
 - e. Procedures for determining Plant Available Nitrogen (PAN) loading rates.
 - f. Record keeping forms for tracking each field and storage structure. This shall include testing results, crops, yields, and application rates for each field.
 - g. A procedure for promptly reporting spills or discharges to the permittee plant manager and to DNR.
 - h. A procedure for recording repair work on gravity sewer lines, recycle lines, and irrigation lines to include the reason for the repair work and the material used for the repair.
 - i. A program to eliminate debris and blockages of sewer lines and recycle lines and to keep debris out of the lagoons.
 - j. A procedure for twice per day visual inspections of the complete waste collection, flushing and recycle system for overflows or other operational problems.
 - k. A program for routine, unannounced inspections of land application sites and records to ensure that all directives for land application from the permittee's central office are being followed. Records of the inspections shall be maintained by the permittee and made available to the department upon request.
 - l. A procedure to assure that all appropriate employees are properly trained in operation of the waste systems and are familiar with the O&M Manual.
 - m. Procedure for adjusting application periods and rates based on per cent slope, soil infiltration capacity, soil moisture content, and percent of soil field (saturation) capacity. Provide procedure for field verification of slopes on each application setting.
 - n. List of number, size, and capacity of waste removal, hauling and land application equipment.
 - o. Number of suitable days each year when land application will occur based on historical 1-in-10-year wettest precipitation and capacity of spreading equipment and personnel available.
 - p. Procedure to avoid application if there is a weather forecast for significant precipitation within 24 hours.
 - q. The O&M manual shall contain an example lease agreement for land application, a current list of leasees with addresses, telephone numbers and field numbers assigned. Lease agreements shall be maintained for department review upon request. Lease agreements shall be reviewed annually in order to maintain 125% of land required for design flows. If land required for design flows falls below 125%, a plan shall be submitted to the department to decrease flows to match the land

available or to implement other acceptable options to insure compliance with this permit.

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C. SPECIAL CONDITIONS (continued)

25. Underground Tile Outlets at Land Application Sites

- a. Any underground tile outlets from field terraces or subsurface field drainage tiles shall be shown on the site maps for all land application sites.
- b. To prevent potential discharge of wastewater during irrigation of fields with underground tile outlets for terraced fields, the permittee shall either cap the inlets at the fields during irrigation, provide a 150 feet grass buffer area between the inlets and wetted irrigation area, use subsurface injection type application equipment or install secondary containment structures below the tile outlets.
- c. The Operation and Maintenance Manual shall include specific operating details for these fields to prevent discharge of wastewater during wastewater irrigation or leaching of nitrogen through the soils and into the tile drainage system.

26. Secondary Containment Structures

- a. There shall be containment structure(s) or earthen dam(s) installed and maintained downgradient of all confinement buildings and sewer lines, gravity outfall lines, recycle pump stations and recycle force mains in order to collect and retain wastewater discharges from spills or pipeline breaks. The containment structure shall be able to collect a minimum volume equal to the maximum pumping capacity of the recycle pump for the wastewater flushing system in any 24-hour period.
- b. Containment structures may also be located below underground tile outlets from irrigation sites or other areas not covered under paragraph a above of this special condition. These structures shall be sized and maintained to collect and retain any wastewater from spillage, pipeline leaks or runoff of wastewater during active wastewater irrigation. Collected wastewater shall be pumped into the lagoon or land applied so that there is no discharge. Once the containment structure has been emptied, it shall be rinsed with fresh water until the ammonia nitrogen content of water remaining in the basin is less than 2.5 mg/L. After rinsing is completed, subsequent storm water runoff events may be released from the containment structure without sampling as long as no additional wastewater enters the containment structure.

27. Domestic Wastewater and Sludges

There shall be no discharge of wastewater or sludge from the domestic wastewater treatment systems. The systems shall be maintained so that no leaks or surfacing of effluent occurs. Septic tanks shall be inspected at least once each year for leaks or surfacing of effluent and necessary corrective action conducted. Accumulated sludge depth in the tank shall be measured at least once every five years and sludge removed as needed. The removed sludge shall be land applied in accordance with 40 CFR 503 sludge standards for septage and University of Missouri Water Quality Guide publication #WQ422 or the sludge may be pumped into the animal waste lagoon.

28. Dead Animal Transfer Stations

There shall be no-discharge from dead animal collection areas or holding areas (dumpsters, holding tanks, stockpiles within livestock production buildings, refrigeration units, etc). The collection and holding areas shall be inspected at least once per day. Any liquid drainage or wash water shall be collected and placed into the animal waste lagoon or hauled off-site to a permitted treatment/disposal facility. There shall not be any discharge from the collection or holding areas to the soil surface or subsurface. Dead animals shall be collected and hauled off site for rendering or disposal in accordance with the Dead Animal Disposal Law under Chapter 269 RSMo.

29. Definition of outfall

A mouth, drainage outlet, or location where permit monitoring and/or limitations apply.